

What is claimed is:

1. An applicator for applying at least a partial coating of a solution to a filament, comprising:

an applicator surface operable to at least partially coat a filament with a  
5 solution;

a first container operable to supply the solution to the applicator surface, a volume of the solution in the first container corresponding to a solution level in the first container;

a second container operable to contain a supply of solution in fluid  
10 communication with the solution in the first container such that the solution in the second container has a solution level indicative of the solution level of the solution in the first container; and

a detector for determining the solution level within the second container, the detector operable to control an adjustment of the volume of the solution in the first  
15 container such that the solution level in the first container is maintained within a predetermined range of levels.

2. The applicator of claim 1, wherein the filament is a glass filament and the solution is a glass fiber sizing composition.

20

3. The applicator of claim 1, wherein the detector is selected from an electrical detector, a mechanical detector, an energy wave detector, an ultrasonic detector and a magnetic detector.

25 4. The applicator of claim 1, wherein the detector is a non-surface contacting detector.

5. The applicator of claim 1, further comprising a flow controller positionable between a source of the solution and the first container to permit flow of the solution  
30 from the source to the first container, and wherein the detector is operable to generate a signal to the flow controller to control the flow of the solution to the first container.

09891007 "062504

6. The applicator of claim 1, wherein the first container includes an overflow level and the predetermined range of levels is below the overflow level.

7. The applicator of claim 6, wherein the overflow level corresponds to a height of the container such that any solution exceeding the overflow level is prevented from returning to the first container.

8. The applicator of claim 1, wherein the applicator surface further comprises an endless belt rotatably supported by at least a first support and a second support, wherein the first support is at least partially positionable below the solution level and the second support is positionable adjacent to a contact area between the applicator surface and the filament.

9. The applicator of claim 8, wherein the predetermined range of levels is such that the applicator surface exits the solution at a constant angle when the solution level is within the predetermined range of level.

10. The applicator of claim 1, further comprising shielding for covering the first container and directing excess external liquid on the shielding away from the solution in the first container, the shielding having an opening, wherein the applicator surface projects from the opening such that the filament is contactable with the applicator surface at the opening.

11. The applicator of claim 10, wherein the first container includes an overflow level corresponding to a height of the first container such that any solution exceeding the overflow level is prevented from returning to the first container and the detector is a non-surface contacting detector, and further comprising a flow controller positionable between a source of the solution and the first container to permit flow of the solution from the source to the first container, and wherein the detector is operable to generate a signal to the flow controller to control the flow of the solution to the first container.

12. The applicator of claim 11, wherein the filament is a glass filament and the solution is a glass fiber sizing composition.

13. The applicator of claim 10, wherein the shielding further comprises side  
5 walls and a top wall of the first container, wherein at least one of the side walls includes an upper edge and the top wall includes a lower edge, and wherein a spacing between the upper edge and lower edge defines the opening.

14. The applicator of claim 10, wherein the shielding further comprises at  
10 least one wall defining a top wall of the first container, the top wall further comprising a lower edge defining an upper end of the opening, and further comprising a gutter positioned along the top wall in close proximity to the opening such that the gutter carries the external liquid away from the opening.

15. The applicator of claim 10, wherein the shielding further comprises at  
15 least one wall extending over the container, the at least one wall comprising a plurality of edges, wherein at least a portion of the plurality of edges define at least one edge of the opening.

20 16. The applicator of claim 15, wherein the shielding further comprises at a deflector positioned above the at least one wall and adjacent to the filament for directing excess liquid away from the opening.

17. The applicator of claim 15, wherein at least a portion of the at least one  
25 wall extends over at least a portion of the applicator surface.

18. An applicator for applying at least a partial coating of a solution to a filament, comprising:

an applicator surface operable to at least partially coat a filament with a  
30 solution;

a container operable to supply the solution to the applicator surface, a volume of the solution in the container corresponding to a solution level in the first container, the container further having an overflow level;

shielding for covering the container and directing excess external liquid on the shielding away from the solution in the container, the shielding having an opening, wherein the applicator surface projects from the opening such that the filament is contactable with the applicator surface; and

5 a detector for determining the solution level within the container, the detector operable to control an adjustment of the volume of the solution in the container such that the solution level in the container is maintained within a predetermined range of levels that is below the overflow level.

10 19. The applicator of claim 18, wherein any solution exceeding the overflow level is prevented from returning to the first container, the applicator surface further comprises an endless belt rotatably supported by at least a first support and a second support, wherein the first support is at least partially positionable below the solution level and the second support is positionable adjacent to a contact area  
15 between the applicator surface and the filament, and the predetermined range of levels is such that the applicator surface exits the solution at a constant angle when the solution level is within the predetermined range of level.

20 20. The applicator of claim 18, wherein the detector is a non-surface contacting detector.

21. An applicator for applying at least a partial coating of a solution to a filament, comprising:

25 a container operable to supply the solution, a volume of the solution in the container corresponding to a solution level in the container;

an endless belt having an applicator surface operable to supply the solution to the filament, the endless belt rotatably supported by at least a first support and a second support, wherein the first support is at least partially positionable below the solution level and the second support is positionable adjacent to a contact area  
30 between the applicator surface and the filament, and wherein a portion of the endless belt that delivers the solution to the contact area forms a predetermined angle with respect to a horizontal axis that is dependent upon a desired film thickness of the solution on the applicator surface; and

adjusters to adjust the position of at least one of the first support or second support.

22. The applicator of claim 21, wherein the filament is a glass filament and  
5 the solution is a glass fiber sizing composition.

23. The applicator of claim 21, wherein the predetermined angle is in the range of 20 degrees to 70 degrees.

10 24. The applicator of claim 21, wherein the film thickness of the solution on the applicator surface is in the range of 50 microns to 400 microns.

25. The applicator of claim 21, wherein the predetermined angle is in the range of 30 degrees to 60 degrees, and wherein the film thickness of the solution on  
15 the applicator surface is in the range of 100 microns to 300 microns.

26. The applicator of claim 21, wherein the first support has a first diameter and the second support has a second diameter, and wherein the second diameter is greater than the first diameter.  
20

27. A system for supplying and applying at least a partial coating of a solution to a filament, comprising:

- a main container operable to supply a solution;
- a local container in fluid communication with the main container for receiving  
25 the solution from the main container, a volume of the solution in the local container corresponding to a solution level in the local container;
- an applicator surface operable to receive the solution from the local container and apply an at least partial coating of the solution to the filament;
- an auxiliary container operable to contain a supply of solution in fluid  
30 communication with the solution in the local container such that the solution in the auxiliary container has a solution level indicative of the solution level of the solution in the local container;
- a flow controller positionable between the main container and the local

container to control a flow of solution from the main container to the local container;  
and

a detector for monitoring the solution level within the auxiliary container,  
wherein the detector is operable to generate a signal to the flow controller in  
5 response to the monitored solution level of the auxiliary container such that the  
solution level in the local container is maintained within a predetermined range of  
levels.

28. The system of claim 27, further comprising shielding for covering the local  
10 container and directing excess external liquid on the shielding away from the solution  
in the local container, the shielding having an opening, wherein the applicator  
surface projects from the opening such that the filament is contactable with the  
applicator surface.

29. The system of claim 28, wherein the detector is a non-surface contacting  
15 detector.

30. The system of claim 29, wherein the filament is a glass filament and the  
solution is a glass fiber sizing composition.

20

31. The system of claim 30, wherein the first container includes an overflow  
level corresponding to a height of the container such that any solution exceeding the  
overflow level is prevented from returning to the first container and the  
predetermined range of levels is below the overflow level.

25

32. The system of claim 30, wherein the applicator surface further comprises  
an endless belt rotatably supported by at least a first support and a second support,  
wherein the first support is at least partially positionable below the solution level and  
the second support is positionable adjacent to a contact area between the applicator  
30 surface and the filament, and the predetermined range of levels is such that the  
applicator surface exits the solution at a constant angle when the solution level is  
within the predetermined range of level.

33. A system for supplying and applying at least a partial coating of a solution to a filament, comprising:

a main container operable to supply a solution;

5 a local container in fluid communication with the main container for receiving the solution from the main container, a volume of the solution in the local container corresponding to a solution level in the local container, the local container having an overflow level;

an applicator surface operable to receive the solution from the local container and apply an at least partial coating of the solution to the filament;

10 shielding for covering the local container and directing excess external liquid on the shielding away from the solution in the local container, the shielding having an opening, wherein the applicator surface projects from the opening such that the filament is contactable with the applicator surface;

a flow controller positionable between the main container and the local  
15 container to control the flow of solution from the main container to the local container; and

a detector for monitoring the solution level within the local container, wherein the detector is operable to generate a signal in response to the monitored solution level to the flow controller such that the solution level in the local container is  
20 maintained within a predetermined range of levels which is below the overflow level.

34. A method of supplying and applying at least a partial coating of a solution to a filament, comprising:

25 storing a volume of a solution in a container having an inlet connected to a supply of the solution, the volume of the solution in the container being associated with a solution level in the container;

coating at least a portion of an applicator within the container with the solution;

30 contacting at least one filament with the applicator to at least partially coat the filament with the solution;

monitoring the solution level within the container;

generating a signal indicative of the monitored solution level;

adjusting the solution level to a level within a predetermined range of levels based on the monitored solution level; and

isolating the solution in the container from receiving any excess liquid accumulated on the container or any portion of the solution exceeding the overflow level.

35. The method of claim 34, wherein the signal is received by a flow controller and when the monitored solution level is below the predetermined range of levels, the flow controller allows flow of additional solution into the container in response to the signal, so as to adjust the solution level.

36. The method of claim 35, wherein the container includes an overflow level such that any solution exceeding the overflow level is separated from solution in the container and the predetermined range of levels is below the overflow level.

37. The method of claim 35, wherein adjusting the solution level further comprises controllably switching the flow controller between a first position and a second position in response to the signal associated with the solution level, the first position for allowing a flow of the solution into the container and the second position for blocking the flow of the solution into the container.

38. The method of claim 35, wherein the applicator surface further comprises an endless belt rotatably supported by at least a first support and a second support, and further comprising positioning at least a portion of the first support below the solution level and maintaining the solution level such that the applicator surface exits the solution at a constant angle when the solution level is within the predetermined range of level. and positioning the second support adjacent to a contact area between the applicator surface and the filament.

39. The method of claim 34, wherein the container is a first container and monitoring comprises positioning a second container proximate to the first container; interconnecting the first container with the second container such that solution can flow between the first container and second container and a solution level of the

09591007 "062501



5

10

15